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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,408	07/21/2003	Chet R. Douglas	P16578	6803

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EXAMINER	
SORRELL, ERON J	

ART UNIT	PAPER NUMBER
2182	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/624,408	DOUGLAS, CHET R.	
	Examiner	Art Unit	
	Eron J. Sorrell	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-15,17-25 and 28* is/are rejected.

7)☐ Claim(s) *9,16 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3,5,6,10,18-20,22,23,27, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Adkisson (U.S. Patent No. 5,590,304).

3. Referring to method claim 1, and article of manufacture claim 18, Adkisson teaches a method for managing requests to an Input/Output (I/O) device (see item 103 in figure 2), comprising:

queuing I/O requests directed to the I/O device (see lines 35-45 of column 5);

determining whether a number of queued I/O requests exceeds a threshold (see lines 35-45 of column 5, wherein Adkisson teaches queuing a "selected number" of requests, and "after which" the queued requests sent as a burst);

if the number of queued I/O requests exceeds the threshold, then calculating a coalesce limit (see lines 29-48 of column 6, wherein Adkisson describes "conditioning the burst");

coalescing a number of queued I/O requests not exceeding the calculated coalesce limit into a coalesced I/O request (see lines 29-48 of column 6); and

transmitting the coalesced I/O request (see lines 35-45 of column 5).

4. Referring to method claim 2 and article of manufacture claim 19, Adkisson teaches the calculated coalesce limit dynamically varies based in part on the number of queued I/O requests (see equation 1 in column 6 and lines 55-67 of column 6).

5. Referring to method claim 3 and article of manufacture claim 20, Adkisson teaches wherein calculating the coalesce limit includes dividing the number of queued I/O requests by an interval (see equation 1 in column 6 and lines 55-67 of column 6).

6. Referring to method claim 5 and article of manufacture claim 22, Adkisson teaches I/O requests are queued in a first

queue (item 200 in figure 2) or a second queue (item 201 in figure 2), wherein determining whether the number of queued I/O requests exceeds the threshold comprises determining whether a number of I/O requests in the second queue exceeds the threshold (see paragraph bridging columns 5 and 6), and wherein coalescing the number of queued I/O requests comprises coalescing I/O requests from the first queue (see paragraph bridging columns 5 and 6).

7. Referring to method claim 6 and article of manufacture claim 23, Adkisson teaches adding the transmitted coalesced I/O request to the second queue (see paragraph bridging columns 5 and 6).

8. Referring to method claim 10 and article of manufacture claim 27, Adkisson teaches transmitting one I/O request from the queue if the number of queued I/O requests does not exceed the threshold (see lines 35-45 of column 5, note when the I/O rate exceeds the memory rate, the requests are sent every clock cycle).

9. Referring to claim 28, Adkisson teaches the device comprises a computer readable medium or a hardware component (see item 102 in figure 2).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adkisson in view of Gunlock et al. (U.S. Patent No. 5,522,054 hereinafter "Gunlock").

12. Referring to method claim 4 and article of manufacture claim 21, Adkisson teaches determining a maximum number of queue I/O requests up to the coalesce limit (see lines 29-48 of column 6), however Adkisson is silent as to that storage requests being directed to data stored at sequential locations.

Gunlock teaches, in an analogous system, the above limitation (see lines 40-60 of column 2).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Adkisson with the above teachings of Gunlock. One of ordinary skill in the art would have been motivated to make such modification in order to improve disk drive performance as suggested by Gunlock (see paragraph bridging columns 2 and 3).

13. Claims 7,8,11-13,15,17,24,25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adkisson in view of Marcotte (U.S. Patent No. 6,292,856).

14. Referring to method claim 7 and article of manufacture 24, Adkisson teaches the method of claim 5 and article of manufacture of claim 18, and further teaches the second queue being implemented in a controller of the I/O device (see item 201 within item 102 in figure 2). Adkisson is silent on the first queue being maintained by a device driver.

Marcotte teaches, in an analogous system, the above limitation (see item 74 within item 42 in figure 4).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Adkisson with the above teachings of Marcotte. One of

ordinary skill in the art would have been motivated to make such modification selectively cancel or move the request to a difference device for servicing as suggested by Marcotte (see abstract).

15. Referring to method claim 8 and article of manufacture claim 25, Adkisson teaches the controller is a storage controller (see lines 6-24 of column 5), and the device is a storage device (see item 103 in figure 2).

16. Referring to claim 11, Adkisson teaches a system (see figure 1) for managing requests to a storage device (see item 103a in figure 1), wherein the storage controller manages access to the storage device, comprising:

a processor (see item 101a in figure 1);

a memory device accessible to the processor (see item 103a in figure 1);

wherein the operations are performed, the operations comprising:

queuing I/O requests directed to the I/O device (see lines 35-45 of column 5);

determining whether a number of queued I/O requests exceeds a threshold (see lines 35-45 of column 5, wherein Adkisson

teaches queuing a "selected number" of requests, and "after which" the queued requests sent as a burst);

if the number of queued I/O requests exceeds the threshold, then calculating a coalesce limit (see lines 29-48 of column 6, wherein Adkisson describes "conditioning the burst");

coalescing a number of queued I/O requests not exceeding the calculated coalesce limit into a coalesced I/O request (see lines 29-48 of column 6); and

transmitting the coalesced I/O request (see lines 35-45 of column 5).

Adkisson fails to teach the above operations are performed by a device driver executed by the processor.

Marcotte teaches, in an analogous system, the above limitation (see item 74 within item 42 in figure 4).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Adkisson with the above teachings of Marcotte. One of ordinary skill in the art would have been motivated to make such modification selectively cancel or move the request to a difference device for servicing as suggested by Marcotte (see abstract).

17. Referring to claim 12, Adkisson teaches the calculated coalesce limit dynamically varies based in part on the number of queued I/O requests (see equation 1 in column 6 and lines 55-67 of column 6).

18. Referring to claim 13, Adkisson teaches wherein calculating the coalesce limit includes dividing the number of queued I/O requests by an interval (see equation 1 in column 6 and lines 55-67 of column 6).

19. Referring to claim 15, Adkisson teaches I/O requests are queued in a first queue (item 200 in figure 2) or a second queue (item 201 in figure 2), wherein determining whether the number of queued I/O requests exceeds the threshold comprises determining whether a number of I/O requests in the second queue exceeds the threshold (see paragraph bridging columns 5 and 6), and wherein coalescing the number of queued I/O requests comprises coalescing I/O requests from the first queue (see paragraph bridging columns 5 and 6).

20. Referring to claim 17, Adkisson teaches transmitting one I/O request from the queue if the number of queued I/O requests does not exceed the threshold (see lines 35-45 of column 5, note

when the I/O rate exceeds the memory rate, the requests are sent every clock cycle).

21. Claims 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adkisson in view of Marcotte as applied to claim 11 above and further in view of Gunlock.

22. Referring to claim 14, Adkisson teaches determining a maximum number of queue I/0 requests up to the coalesce limit (see lines 29-48 of column 6), however the combination of Adkisson and Marcotte fails to teach the storage requests being directed to data stored at sequential locations.

Gunlock teaches, in an analogous system, the above limitation (see lines 40-60 of column 2).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the combination of Adkisson and Marcotte with the above teachings of Gunlock. One of ordinary skill in the art would have been motivated to make such modification in order to improve disk drive performance as suggested by Gunlock (see paragraph bridging columns 2 and 3).

Allowable Subject Matter

23. Claims 9,16,26 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach alone or in combination the limitation of determining whether there are at least two I/O requests in the first queue after determining that the number of requests in the second queue in the second queue exceeds the first queue.

Response to Arguments

25. Applicant's arguments, see pages 12 and 13, filed 10/12/05, with respect to claims 9,16, and 26 have been fully considered and are persuasive. The rejection of 9,16, and 26 has been withdrawn.

26. Applicant's arguments with respect to claims 1-8,10-15,17-25,27, and 28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eron J. Sorrell whose telephone number is 571 272-4160. The examiner can normally be reached on Monday-Friday 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on 571-272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KIM HUYNH
PRIMARY EXAMINER

EJS
December 23, 2005

12/23/05